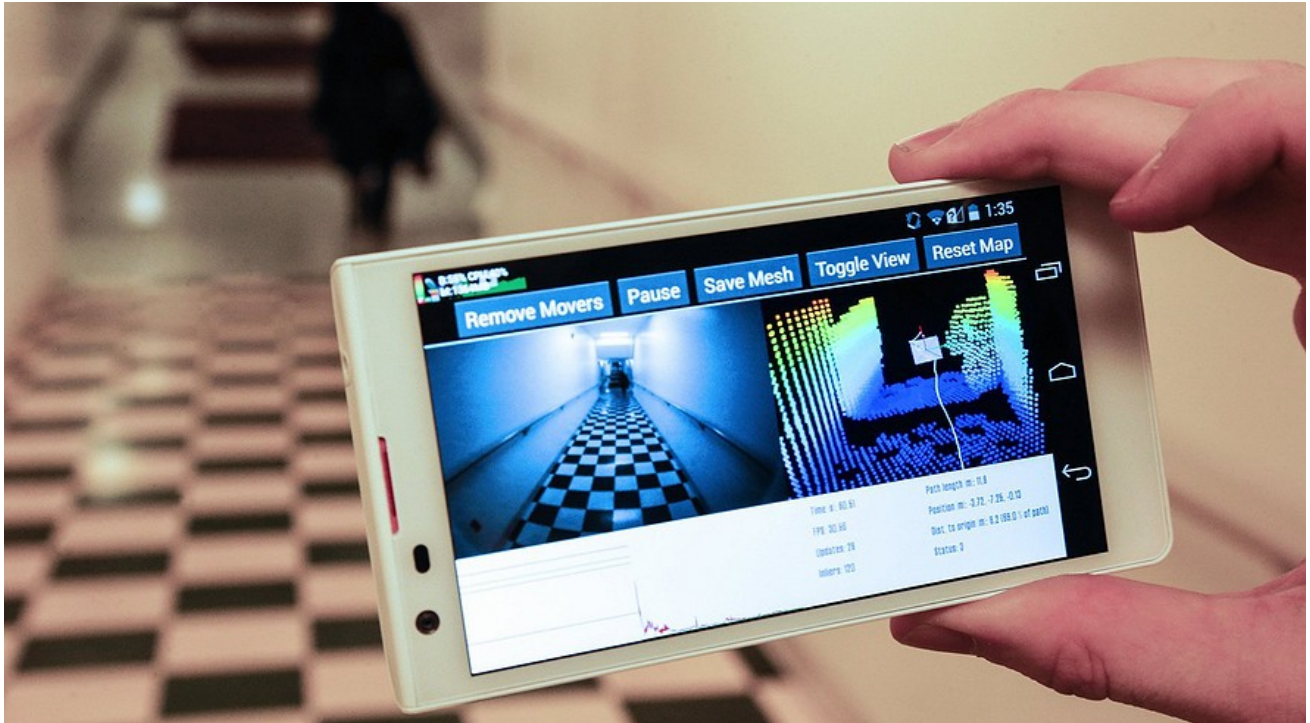


# Getting smartphones to create 3-D indoor maps on the go

By Minneapolis Star Tribune, adapted by Newsela staff on 03.31.14

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A smartphone with the 3-D program running showed a hallway in a University of Minnesota building, March 8, 2014. The hope is the software can help build 3-D maps on the fly. Marlin Levison/Minneapolis Star Tribune/MCT

The scientists in the basement laboratory are looking at an amazing view.

It's not out of the tiny windows of the half-underground office, though. The view is on a smartphone that computer science Professor Stergios Roumeliotis is using while walking around the University of Minnesota's Walter Library.

On the screen, a three-dimensional map of a nearby hallway has appeared. The map was made by holding the smartphone's camera while walking. The camera and the phone's motion sensor worked together to create a grid of data points that became a 3-D image.

Grad students at the University of Minnesota are working with Google Inc. to create smartphones that can create 3-D maps on the go. Google gave a \$1.35 million grant to the university for this project.

## "Google Maps Of The Indoor World"

Smartphones that can easily create 3-D maps would be a huge breakthrough.

“We will soon be able to get smartphone directions for how to go from one place to another in a building, such as how to go from the entrance to my classroom,” Roumeliotis said. “We’ll also be able to ask the phone questions, such as, ‘Where is the closest place within the airport where I can get coffee?’”

In addition, homeowners could use the software to create a digital tour of their houses before putting them up for sale, Roumeliotis said. The software could also help the blind walk through a building or help military aircraft navigate.

While the software is being designed to work on an upcoming Google smartphone, it will also work on existing smartphones. Notably, it doesn’t use much processing power, about as much as the game “Angry Birds,” Roumeliotis said.

Professor Roumeliotis, 43, has been working on map technology since 1995. He says this new technology could be as important as Google Maps, which revolutionized navigation.

“It has the potential to become the Google Maps of the indoor world, and this is where we spend most of our time,” he said.

Scott Strawn, a business analyst who follows Google closely agrees that 3-D mapping might have a huge impact in the near future.

## Almost Instant Mapping

The mapping software could be used for Google Glass, the company’s wearable computer, said Strawn. This means that while wearing the Google glasses, you could see improved “augmented reality.”

“Augmented reality” means you see the real world, but the computer displays helpful information in front of the real-world objects. For example, while walking down the street, you could see user ratings of restaurants that are around you.

One of the key features of the University of Minnesota software is that it creates a map almost instantly without slowing down the phone or using much battery power.

To do that, the University of Minnesota team had to try some creative design ideas.

For example, the new software doesn’t use global positioning satellite signals, because the signals aren’t usually available indoors. Instead, the software uses the phone’s camera and built-in motion sensor.

“We pick which information to process,” Roumeliotis said. “That way we don’t choke the phone’s processor chip or drain the battery.”

The University of Minnesota scientists previously worked with NASA to create software to navigate Mars landing vehicles. They are building on that work for the 3-D mapping project.

## **Tapping A University's Brainpower**

Roumeliotis said the software that his group is developing for Google “will be ready within less than a year.”

But Strawn thinks Google won't offer the University of Minnesota software as a public product for several years. That would give app developers time to come up with 3-D applications that can take advantage of the new technology.

Google often spends years tweaking and testing a new product before releasing it to the public, Strawn said.

It's not unusual for Google to reach out to universities for help in creating new technology, Strawn said.

“There's a lot of valuable brainpower in the university system, and that's what Google needs to move these projects forward,” he said.

Roumeliotis points out that today, you could map the inside of the Mall of America, but it would take many computers and a lot of time.

“Our plan is to do that on a cellphone in almost real time,” he said. “We're on the frontier of this kind of mapping.”

## Quiz

- 1 Which of the following about 3-D mapping software for smartphones is NOT TRUE?
  - (A) It will work both on an upcoming Google smartphones as well as existing smartphones.
  - (B) A scientist at the University of Minnesota has been working on map technology for the past 19 years.
  - (C) The software can also be used for Google Glass to improve "augmented reality."
  - (D) It uses global positioning satellite signals to save the phone's battery.
  
- 2 The 3-D mapping software will NOT be helpful for which of the applications?
  - (A) getting directions to various places within a building
  - (B) creating digital tours of houses for homeowners and realtors
  - (C) helping the armed forces with the navigation of military aircraft
  - (D) creating software to help people navigate around large parks
  
- 3 Select the paragraph from "Almost Instant Mapping" that discusses the advantage of the 3-D mapping software in terms of speed of the phone.
  
- 4 What is the advantage of built-in motion sensors of smartphones in 3-D mapping?
  - (A) It helps in creating 3-D images faster than anything else.
  - (B) It helps in creating 3-D images for indoor locations.
  - (C) It helps in processing 3-D images using GPS signals.
  - (D) It helps in processing 3-D images using faster processor chips.